ASSIGNMENT 3

Textbook Assignment: “Electrical Distribution,” chapter 4, pages 4-1 through 4-33.

3-1. What distribution system configuration is the simplest and least expensive to build?

1. Radial
2. Loop
3. Network
4. Primary

3-2. The loss of which of the following components in a radial distribution system will result in an outage on all loads served by the feeder?

1. Cable
2. Primary supply
3. Transformer
4. Each of the above

3-3. Service to a radial distribution system can be improved by the installation of which of the following components?

1. Hand reset circuit breakers
2. Automatic circuit breakers
3. Auto-protected transformers
4. Additional lightning protective devices

3-4. In the loop distribution system, how many sectionalizing breakers are installed near the distribution transformers to open each primary cable?

1. One
2. Two
3. Three
4. Four

3-5. A network system and a radial system differ in what respect?

1. The ‘type of transformers used
2. The type of fuses used
3. The way the secondaries are connected
4. The way the primaries are connected

3-6. If a new primary feeder system must be flexible because of probable future growth, what type of system should you recommend?

1. Network
2. Radial
3. Loop

3-7. Which of the following books is an excellent source of information on electrical distribution systems?

1. *American Electrician's Handbook*
2. *Standard Handbook for Electrical Engineers*
3. *The Lineman's and Cableman's Handbook*
4. *National Electrical Code®*

3-8. Which of the fallowing concerns may be addresssd when installing a new power distribution addition?

1. Select the straightest and shortest route
2. Route the system in the general direction of future load demands
3. Make the system readily accessible for construction, inspection and maintenance
4. All of the above

3-9. What type of pole is considered to be the most economical for power line support?

1. Fiberglass
2. Steel
3. Wood
4. Reinforced concrete

3-10. Which of the following means of disposal should you use for a creosote-treated wooden pole?

1. Burning
2. EPA approved landfill
3. Burying
4. Either 2 or 3 above

3-11. Which of the following means is used to classify a wooden pole?

1. Length
2. Circumference at the top of the pole
3. Circumference measured 6 feet from the bottom of the pole
4. All of the above

3-12. Lightning arresters for a distribution transformer should be located between which of the following areas?

1. Primary mains and fuse cutouts
2. Primary and secondary sides of the transformer
3. Fuse cutouts and the secondary bushings of the transformer
4. Secondary side of the transformer and the service drop

3-1 3. Which of the following types of distribution transformers require the installation of external protective devices?

1. Conventional
2. Self-protected
3. Both 1 and 2 above
4. Completely self-protected

3-14. What feature does the completely self-protected (CSP) type of transformer have that differs from the other types?

1. A built-in circuit breaker
2. A fuse cutout mounted to the outside of the transformer
3. A beeper that sounds when there's trouble within the transformer
4. Two tap changers: one primary and one secondary

3-15. How much oil should be put in a transformer?

1. Fill up to the rim
2. Standard 5 gallons
3. Fill up to the oil-level line
4. Add as much oil as needed to cover the secondary coils only

A. Liquid-immersed water-cooling
B. Liquid-immersed self-cooling
C. Air-blast cooling
D. Self-air cooling

Figure 3A

IN ANSWERING QUESTIONS 3-16 THROUGH 3-19, REFER TO FIGURE 3A, AND SELECT THE TRANSFORMER DESCRIBED IN THE QUESTION.

3-16. This transformer has a cooling method that cools by surrounding air at atmospheric pressure.

1. A
2. B
3. C
4. D

3-17. This transformer has a cooling method that has the core and windings encased in a metal enclosure through which air is circulated by a blower.

1. A
2. B
3. C
4. D

3-18. This transformer has a cooling method that has water circulated through coils and carries away the heat from the oil as it rises in the tank.

1. A
2. B
3. C
4. D

3-19. This transformer has a cooling method that has its coils and core completely immersed in transformer oil.

1. A
2. B
3. C
4. D

3-20. Which of the following types of transformers would you find in a major substation?

1. Completely self-protected (CSP)
2. Current
3. Air-blast-cooling
4. Auto

3-21. Old transformers may contain which, if any, of the following dangerous chemical elements?

1. CO_2R_2
2. PCBs
3. CO_2H_2
4. None

3-22. Which of the following safety precautions will protect you when handling Askarel® oil?

1. Wearing impermeable gloves
2. Wearing splashproof goggles
3. Properly ventilating the work space
4. All of the above

3-23. When removing Askarel® oil that is contaminated with PCBs, an air respirator may be necessary,

1. True
2. False

3-24. The ground resistance between the ground wire and the ground distribution neutral should read no more than how many ohms?

1. 10
2. 25
3. 50
4. 66

3-25. Which of the following actions will lower ground resistance?

1. Drive additional ground rods
2. Connect additional ground rods in parallel
3. Use larger ground rods
4. All of the above

3-26. Which of the following terminal markings is correct for a transformer with additive polarity?

1. H2H1-X1X2
2. H1H2-X2X1
3. Both 1 and 2 above
4. H1H2-X1X2

3-27. Transformers larger than 100 kVA are usually mounted on which of the following places?

1. Pad or platform
2. Pole below the secondary mains
3. Pole above the secondary mains
4. Cluster mount above the primary mains

3-28. At what height above the base of the pole are ground wires required to be covered with plastic or wood molding?

1. 6 feet
2. 8 feet
3. 10 feet
4. 12 feet

3-29. When determining the size of a transformer for a certain load, how should you calculate the approximate maximum demand load?

1. Divide the total maximum connected load by the demand factor
2. Divide the demand factor by the total maximum connected load
3. Multiply the total maximum connected load by the demand factor
4. Multiply the total maximum connected load by the power factor

3-30. Power capacitors are used in distribution systems to supply what electrical factor?

1. Capacitive reactance
2. Inductive reactance
3. Reactive voltamperes
4. Impedance

3-31. When voltage and current waves do not have the same direction at the same instant they are said to be

1. in phase
2. out of phase
3. lagging phase
4. leading phase

3-32. When current and voltage in a circuit rise and fall in value together, in the same direction at the same instant, what is the power factor in that circuit?

1. Zero
2. .75
3. .80
4. 1.0

3-33. What is the unit of measurement for apparent power?

1. ohms
2. Watts
3. Voltamperes
4. Watts per voltamperes

3-34. What is the cause of low power factor in an electrical circuit?

1. High load resistance
2. Low impedance
3. High amount of inductance
4. Low inductive reactance

3-35. Which of the following electrical components is used for power factor correction?

1. Booster transformer
2. Filter resistor
3. Inductive filter
4. Synchronous motor

3-36. What device is most economical to correct a low power factor?

1. Synchronous motor
2. Capacitor
3. Inductor
4. Filter resistor

3-37. Capacitance is the opposite of what electrical factor?

1. Resistance
2. Impedance
3. Conductance
4. Inductance

3-38. What happens when a capacitor is operated below its rated frequency?

1. kvar rating is reduced
2. kvar rating is increased
3. Current is reduced
4. Voltage is reduced

3-39. Other than for power factor correction, a capacitor in an electrical distribution system can be used for which of the following purposes?

1. Current boost during heavy loads
2. Voltage boost during heavy loads
3. Current boost when the power factor is low
4. Voltage boost when the power factor is low

3-40. After a capacitor has been disconnected from an energized circuit, how long should you wait before connecting it back to the circuit?

1. 1 hour
2. 1 l/2 hours
3. 5 minutes
4. 15 minutes

3-41. Before shorting the terminals of a capacitor, which of the following precautions should you follow?

1. Wait 15 minutes
2. Make sure the capacitor voltage is zero
3. Make sure the terminals are grounded to earth
4. All of the above

3-42. When a capacitor is installed to switch a circuit on and off, the switching device should be rated at what percentage of the capacitor rating?

1. 80%
2. 100%
3. 125%
4. 135%

3-43. Capacitors rated at 600 volts or more with built-in discharge resistors are required by the *National Electrical Code*® to be discharged in 5 minutes to what minimum voltage?

1. 5 volts
2. 15 volts
3. 50 volts
4. 100 volts.

3-44. Primary capacitors used in distribution systems are rated at what minimum voltage?

1. 600 volts
2. 1,000 volts
3. 2,400 volts
4. 3,000 volts

3-45. Capacitors installed in an open-rack configuration are normally connected in which of the following manners?

1. Delta
2. Parallel
3. Series
4. Wye

3-46. After a capacitor bank has been installed, it should be inspected and checked at what minimum interval?

1. Once a week
2. Once a month
3. Twice a month
4. Once a year

3-47. Maintenance for an oil switch operating a capacitor bank should be performed after the switch has been operated on and off for what maximum number of times?

1. 500
2. 1,500
3. 2,500
4. 3,000

3-48. A surge arrester performs which of the following functions?

1. Allows follow-up currents to flow to ground
2. Drains off excess voltage through the capacitor banks
3. Drains off excess voltage to ground
4. Drains off excess current to ground

3-49. Enclosed cutouts are designed to operate at what maximum voltage?

1. 2,400 volts
2. 5,000 volts
3. 7,200 volts
4. 10,000 volts

3-50. Primary fuse links with no electrical load must withstand what minimum pound pull?

1. 5
2. 10
3. 15
4. 25

3-51. For an electrical distribution system to be safe, distribution transformers are protected against the slightest overload.

1. True
2. False

3-52. What is the minimum number of lineman required to open a ganged three-way switch?

1. One
2. Two
3. Three
4. Four

3-53. Opening a disconnect switch in a circuit where current is flowing could cause which of the following conditions?

1. Circuit overload
2. Circuit overcurrent
3. Circuit overvoltage
4. Short circuit

3-54. The oil in an oil switch serves which of the following purposes?

1. Lubricant for the moving parts
2. Extinguishing agent for the electrical arc
3. Coolant during heavy loads
4. Insulator for the live parts

3-55. When an oil switch opens a circuit automatically because of an overload or short circuit, which of the following components should be installed with the oil switch?

1. Fuse
2. Magnetic relay
3. Overload relay
4. Trip coil

3-56. What is the purpose of a recloser in a distribution circuit?

1. It opens the circuit in case of a fault, locks the switch in the open position, then recloses the circuit immediately after the fault is corrected
2. It recloses an open circuit automatically after the circuit has the sufficient amount of power
3. It recloses an open circuit only when it is signaled remotely by the substation operator to close
4. It opens the circuit in case of a temporary fault and recloses the circuit a few times until the fault is corrected

3-57. A recloser could be set to re-close at what maximum number of times?

1. One
2. Five
3. Three
4. Four

3-58. Which of the following statements describes a difference between a fuse link and a recloser?

1. A fuse link has a lower ampere rating
2. A fuse link has a higher voltage rating
3. A fuse link can distinguish between temporary and permanent fault
4. A fuse link cannot distinguish between temporary and permanent fault

3-59. When a de-energized line runs parallel to an unloaded energized line, which of the following electrical characteristics could be picked up?

1. Capacitance
2. Static current
3. Static voltage
4. Induced voltage

3-60. When a de-energized line runs parallel to a loaded energized line, which of the following electrical characteristics could be picked up?

1. Capacitance
2. Static current
3. Static voltage
4. Induced voltage

3-61. When working with de-energized power lines, which of the following precautions is the best way to avoid accidentally energizing the lines?

1. Post a watchstander by the power switch
2. Put a lock on the power switch
3. Install short circuiting and grounding: leads to the lines
4. All of the above

3-62. What is the maximum recommended distance between manholes?

1. 400 feet
2. 500 feet
3. 600 feet
4. 1,000 feet

3-63. What is the smallest allowable size of a manhole?

1. 2- by 3-foot
2. 3- by 4-foot
3. 5- by 7-foot
4. 6- by 6-foot

3-64. When determining the size of manhole to be used for transformers, how many cubic feet should you allow per kilovoltampere rating of the transformer?

1. 1 to 1 l/2
2. 2 to 3
3. 3 1/2 to 4
4. 4 l/2 to 5

3-65. Uppermost ducts installed on a manhole should have a minimum of which of the following depths from the ground?

1. 18 inches
2. 30 inches
3. 3 feet
4. 4 feet

3-66. Communication cables installed underground should be buried at what minimum depth?

1. 18 inches
2. 2 feet
3. 3 feet
4. 30 inches

3-67. Before you completely bury an underground cable, what should you place above the cable?

1. Concrete markers
2. Plastic streamers
3. Three-inch layer of sand
4. Each of the above

3-68. A 600-volt direct burial cable should be installed at what minimum depth?

1. 12 inches
2. 18 inches
3. 24 inches
4. 30 inches

3-69. Which of the following means should be used for water drainage from a manhole?

1. Ducts that slope down from the manhole
2. Pumps installed in the manhole
3. A central drain hole, a dram line, and a sump for the manhole
4. A series of drainage holes bored on the deck of the manhole

3-70. When a duct line is set in concrete, there should be a minimum of how many inches of concrete around each line of duct?

1. 6
2. 9
3. 3
4. 12

3-71. Which of the following methods is used to clean ducts?

1. Wiping
2. Vacuuming
3. Rodding
4. Each of the above

3-72. You are pulling multiple cables through a duct. You should pull the cable at what rate?

1. 25 feet per minute
2. 35 feet per minute
3. 50 feet per minute
4. 75 feet per minute

3-73. Before you enter an underground structure, which of the following people must certify it as being safe?

1. Safety chief
2. Safety officer
3. Confined space manager
4. Commanding officer